

AMENDMENT TO CLAIMS:

1. (Cancelled)

2. (Cancelled)

3. (Currently Amended) A method for increasing the specific activity of an E1 endoglucanase containing a glycosyl hydrolase site to form a mutated glycosyl hydrolase for use on a cellulose substrate relative to an unmutated form of the glycosyl hydrolase site, comprising: replacing an active site glycosyl-stabilizing amino acid of the hydrolase with an amino acid, ~~the replacing amino acid binding that binds~~ cellobiose less tightly than the glycosyl-stabilizing amino acid to provide a mutant glycosyl hydrolase, said glycosyl-stabilizing amino acid is selected from the group consisting of tryptophan, phenylalanine, and tyrosine, ~~and tyrosine~~ and said replacing amino acid is selected from the group consisting of alanine, valine, serine, glutamic acid, arginine and glycine; wherein said active or mutant site is selected from tryptophan 30, 39, 171, 181, 212 and 259; phenylalanine 229 and 258; and tyrosine 245.

4. (Cancelled)

5. (Cancelled)

6. (Cancelled)

7. (Currently Amended) The method of claim-3, wherein the mutant glycosyl hydrolase is selected from the group consisting of:

GCGGGCGGGGGCTATTGGCACACGAGCGGGCGGGGAGATCCTGGACGGGAACAACGT
GCGGGTACGGATCGCCGGCATCAACTGGTTTGGGTTTCGAAACCTGCAATTACGTCGT
GCACGGTCTCTGGTCACGCGACTACCGCAGCATGCTCGACCAGATAAAGTCGCTCGG
CTACAACACAATCCGGCTGCCGTA CTCTGACGACATTCTCAAGCGGGGCACCATGCC

GAACAGCATCAATTTTACCAGATGAATCAGGACCTGCAGGGTCTGACCTCCTTGGC
GGTCATGGACAAAATCGTCGGCTACGCCGGTCAGATCGGGCTGGGCATCATTCTTGA
CGGCCACCGACCGGATTGACGCGGGCAGTCCGGCGCTGTGGTACACGAGCAGCGTCT
CGGAGGGCTACGTGGATTTCCGACCTGCAAGCGCTGGCGCAGCGCTACAAGGGAAAC
CCGACGGTCTGTCGGCTTTGACTTGCACAACGAGCCGCATGACCCGGGCTGCTGGGGG
TGGGGGGATCCGAGCATCGACTGGCGATTGGCCGGCCGAGCGGGGCCGGAACGCCCGT
GCTCTCGGTGAATCCGAACCTGCTCATTTTCTGCGAAGGTGTGCAGAGCTACAACGG
AGACTCCTACTGGTGGGGGCGGCAACCTGCAAGGAGCCGGCCAGTACCCGGTCTGTG
TGAACGTGCCGAACCGCCTGGTGTACTCGGGCCACGACTACGCGACGAGCGTCCGG
CCGCAGACGTGGTTTACGGATCCGACCTTCCCCAACAAGATGCCCGGCATCTGGAAC
AAGAACTGGGGATACCTCTTCAATCAGAACATTGCACCGGTATGGCTGGGGCGAATTG
GGTACGACACTGCAATCCACGACCGACGAGCGTGGCTGAAGACGCTCGTCCAGTA
CCTACGGCCGACCGCGCAATACGGTGGGGACAGCTTCCAGTGGACCTTCTCGTCTGT
GAACCCCGATTCCGGCGACACAGGAGGAATTCTCAAGGATGACTGGGAGACGGTCC
ACACAGTAAAAGACGGCTATCTCGGGCCGATCAAGTCTCGATTTTGGATCCTGTCT
AATGAATCGCCTAGCAGTCAACCGTCCCGGTGGGTGTCGCCGTCTCCGTCCCGGAGC
CGGTCCGGCGAGTCCGACGGCGACGGCTACTCCGACGCGGACAGCCAGCCCGACGGC
AACCGTGACCCCTACTGCTACGGCCACGGCCACGGCAAGCCCGACGGCGTCACCGA
CGGCAGCCTCGGGAGCCCGCTGCACCGCGAGTTACCAGGTCAACAGCGATTGGGGC
AAT,

CGCGCGCGCGCTATTGGCAGACGAGCGCGCGGGAGATCCTGGACGCGAACAACGT
GCGGGTACGGATCGCCGGCATCAACTGGTTTGGGTTGGAACCTGCAATTACGTGGT
GCACGGTCTCCGGTCACGGGACTACCGCAGCATGCTCGACCAGATAAAGTCGGCTCG
GCTACAAGACAATCGCGGCTGCGGTAAGTCTGACGACATTCTGAAGCGCGGGCACCATGC
CGAACAGCATCAATTTTTACCAGATGAATCAGGACCTGCAGGGTCTGACGTCCCTTGC
AGGTCATGGACAAAATCGTCGGGTACGCGGGTCAGATCGGCCTGCGGCATCATTCTTG
ACCGCCACCGACCGGATTGCGAGCGGGCAGTCGGCGCTGTGGTACACGAGCAGCGTG
TCGGAGGCTACGTGGATTTCGACCTGCAAGCGCTGGCGCAGCGCTACAAGGGAAA
CCCGACGGTGGTGGGCTTTGACTTGCACAACGAGCGCGCATGACCGGGCGCTGCTGGGG
CTGCGCGGATCCGAGCATCGACTGGCGATTGGCGCGCGAGCGGGCGCGAAACGCGG
TGCTCTGGGTGAATCCGAACCTGCTCATTTCGTGGAAGGTGTGCAGAGCTACAACG
GAGACTCGTACTGGTGGGGCGGCAACCTGCAAGGAGCGCGCGCAGTACCCGGTCTGTG
CTGAACGTGCGGAACCGCGCTGGTGTACTCGGCGCAGGACTACCGGACGAGCGTCTA
GCGGCAGACGTGGTTCAGCGATCCGACCTTCGCGCAACAACATGCCCGGGCATCTGGAA
CAAGAACTGGGGATACCTCTTCAATCAGAACATTGCACCGGTATGGCTGGGCGAATT
GGGTACGACACTGCAATCCACGACCGACGAGACCTGGGTGAAGACGCTCGTCCAGT
ACCTACGGCGCGACCGGGCAATACGGTGGCGACAGCTTCAGTGGACCTTCTGGTCCCT
GGAACCCCGATTCCGGCGACAGAGGAGGAATTCTCAAGGATGACTGGCAGACGGTC
GACAGAGTAAAGACGGCTATCTCGCGCGGATCAAGTCGTGGATTTCGATCCGTGTC
TAATGAATCGCCTAGCAGTCAACCGTCCCCGTGGGTGTGCGCGGTCTCCGTGCGCGAG
CCCGTGGGGGAGTGGGACGCGGACGGCTACTCGGACGCGGACAGCCAGCGCGAGCGG
CAACGCTGACCCCTACTGCTACGCCCACGCCCAGGGCAAGCCCGACGCGGTACCGG
ACGGCAGGCTCCGGAGCGCGCTGCACCGCGAGTTACCAAGGTCAACAGCGATTGGGG

CAATGGCTTCACGGTAACGGTGGCCGTGACAAATTCCG, and

GGGGGGGGGGCTATTGGCAGACGAGCGGCCGGGAGATCCTGGACGCGAACAACGT
GGGGGTACGGATCGCCGGCATCAACTGGTTTGGGTTCGAAACCTGCAATTACGTCTGT
GCACGGTCTCTGGTCACGGGACTACCGGAGCATGCTCGACCAGATAAAGTCGCTCGG
GTACAACACAATCCGGCTGCCGTACTCTGACGACATTCTCAAGCCGGGGCACCATGGC
GAACAGCATCAATTTTCGGGCAGATGAATCAGGACCTGCAGGGTCTGACGTCTTGA
GGTCATGGACAAAATCGTCGCGTACGCCGGTCAGATCGGCCCTGCGCATGATTCTTGA
CCGCCACCGACCGGATTGCAGCGGGCAGTCGGCGCTGTGGTAGACGAGCAGGGTCT
GGGAGGCTACGTGGATTTCCGACCTGCAAGCGCTGGCGCAGGGCTACAAGGGAAAC
CCGACGGTGGTGGGCTTTGACTTGCACAACGAGCCGCATGACCCGGGCTGCTGGGGC
TGCGGGCGATCCGAGCATCGACTGGCGATTGGCCCGCCGAGCGGGCCCGGAAACGCCGT
GCTCTGGGTGAATCCGAACCTGGTCATTTTCGTGGAAGGTGTGCAGAGCTACAACGG
AGACTCCTACTGGTGGGGCGGCAACCTGCAAGGAGCCGGCCAGTACCCGGTGGTGG
TGAACGTGCCGAACCGGCTGGTGTACTCGGCGCAGGACTACGCGACGAGCGTCTAC
CCGCAGAGGTGGTTTCAGGATCCGACCTTCCCCAACAACATGCCCGGCATCTGGAAC
AAGAACTGGGGATACCTCTTCAATCAGAACATTGCACCGGTATGGCTGGGCGAATTG
GGTACGACACTGCAATCCACGAGCGGACGAGAGGTGGCTGAAGACGCTCGTCCAGTA
GCTACGGCCCGACCGCGCAATACGGTGGGACAGCTTCCAGTGGAGCTTCTGGTGGTG
GAACCCCGATTCCGGCGACACAGGAGGAATTCTCAAGGATGACTGGCAGACGGTGG
AGACAGTAAAAGACGGGTATCTCGGGCCGATCAAGTCGTGATTTTCGATCCTGTCT
AATGAATCGGCTAGCAGTCAACCGTCCCGTCCGGTGTGCGCGTCTCCGTCCCGGAGC
CCGTCCGGCGAGTCGGACGCCGACGCCTACTCCGACGCCGACAGCCAGCCCGACGCC

AACGCTGACCCCTACTGCTACGCCACGCCACGGCAAGCCCGACGCCGTCACCGA
 CGGCAGCCTCCGGAGCCCGCTGCACCGCGAGTTACCAGGTCAACAGCGATTGGGGG
 AATGGCTTCACGGTAACGGTGGCCGTGACAAATTCCG

AGGGYWHTSG	REILDANNVP	VRIAGINWFG	FETCNVYVHG	LWSRDYRSM	DQIKSLGYNT	60
IRLPYSDDIL	KPGTMPNSIN	FYQMNQDLQ	LTSLQVMDKI	VAYAGQIGLR	IILDRHRPDC	120
SGQSALWYTS	SVSEATWISD	LQALAORYKG	NPTVVGFDLH	NEPHDPACWG	CGDPSIDWRL	180
AAERAGNAVL	SVNPNLLIFV	EGVQSYNGDS	YWWGGNLQGA	GQYPVVLNVP	NRLVYSAHDY	240
ATSVGPQTWF	SDPTFPNNMP	GIWNKNWGYL	FNQNIAPVWL	GEFGTTLQST	TDQTLWLKTLV	300
QYLRPTAQYG	ADSFQWTFWS	WNPDSGDTGG	ILKDDWQTV	TVKDGYLAPI	KSSIFDPV	358

SEQ ID NO. 2;

AGGGYWHTSG	REILDANNVP	VRIAGINWFG	FETCNVYVHG	LRSRDYRSM	DQIKSLGYNT	60
IRLPYSDDIL	KPGTMPNSIN	FYQMNQDLQ	LTSLQVMDKI	VAYAGQIGLR	IILDRHRPDC	120
SGQSALWYTS	SVSEATWISD	LQALAORYKG	NPTVVGFDLH	NEPHDPACWG	CGDPSIDWRL	180
AAERAGNAVL	SVNPNLLIFV	EGVQSYNGDS	YWWGGNLQGA	GQYPVVLNVP	NRLVYSAHDY	240
ATSVYPQTWF	SDPTFPNNMP	GIWNKNWGYL	FNQNIAPVWL	GEFGTTLQST	TDQTLWLKTLV	300
QYLRPTAQYG	ADSFQWTFWS	WNPDSGDTGG	ILKDDWQTV	TVKDGYLAPI	KSSIFDPV	358

SEQ ID NO. 3;

and

AGGGYWHTSG	REILDANNVP	VRIAGINWFG	FETCNVYVHG	LWSRDYRSM	DQIKSLGYNT	60
IRLPYSDDIL	KPGTMPNSIN	FROMNQDLQ	LTSLQVMDKI	VAYAGQIGLR	IILDRHRPDC	120
SGQSALWYTS	SVSEATWISD	LQALAORYKG	NPTVVGFDLH	NEPHDPACWG	CGDPSIDWRL	180
AAERAGNAVL	SVNPNLLIFV	EGVQSYNGDS	YWWGGNLQGA	GQYPVVLNVP	NRLVYSAHDY	240
ATSVYPQTWF	SDPTFPNNMP	GIWNKNWGYL	FNQNIAPVWL	GEFGTTLQST	TDQTLWLKTLV	300
QYLRPTAQYG	ADSFQWTFWS	WNPDSGDTGG	ILKDDWQTV	TVKDGYLAPI	KSSIFDPV	358

SEQ ID NO. 4 ; or a mixture thereof.

8. (Cancelled)
9. (Cancelled)
10. (Cancelled)
11. (Cancelled).
12. (Cancelled)
13. (Cancelled)
14. (Cancelled)

15. (Cancelled)

16. (Cancelled)

17. (Cancelled)

18. (Cancelled)

19. (Cancelled)

20. (Cancelled)

21. (Cancelled)

22. (Cancelled)

23. (Cancelled)

24. (Cancelled)

25. (Cancelled)

26. (Cancelled)

27. (Cancelled)

28. (Cancelled)

29. (Currently Amended) A method for increasing the specific activity of

Acidothermus cellulolyticus of E1 endoglucanase containing a glycosyl hydrolase site to form a mutated glycosyl hydrolase for use on a biomass substrate, comprising replacing, by site-directed-mutagenesis, an active site associated glycosyl-stabilizing amino acid of the E1 endoglucanase with an amino acid, ~~the replacing amino acid binding that binds~~ cellobiose less tightly than the glycosyl-stabilizing amino acid to provide a mutant E1 endoglucanase; said glycosyl-stabilizing amino acid is selected from the group consisting of tryptophan, phenylalanine and tyrosine, and the replacing amino acid is selected from the group consisting of alanine, valine, serine, glutamic acid, arginine and glycine; wherein said active or mutant site is

selected from tryptophan 30, 39, 171, 181, 212 and 259; phenylalanine 229 and 258; and tyrosine 245.

30. (Cancelled)

31. (Currently Amended) The method of claim 29, wherein the mutant endoglucanase is selected from the group consisting of:

GGGGGCGGCGGCTATTGGCAGACGAGCGGCGGGAGATCCTGGACGCGAACAAGGT
GGGGGTACGGATCGCGGCATCAACTGGTTTGGGTTGAAACCTGCAATTACGTCGT
GCACGGTCTCTGGTCACGCGACTACCGCAGCATGCTCGACCAGATAAAGTCGCTCGG
GTACAACAGAATCCGGGCTGCGGTACTCTGACGACATTCTCAAGCCGGGGACCATGGG
GAACAGCATCAATTTTACCAGATGAATCAGGACCTGCAGGGTCTGACGTCCTTGCA
GGTCATGGACAAAATCGTCGCGTACGCGGGTCAGATCGGCGCTGCGCATCATTCTTGA
CCGCCACCGACCGGATTGCAGCGGGCAGTCGGCGGCTGTGGTACACGAGCAGCGTCT
GGGAGGGTACGTGGATTTCGGACCTGCAAGCGGTGGCGGAGCGGTACAAGGGAAAG
CCGACGGTCTGTCGGCTTTGACTTGCACAACGAGCCGCATGACCCGGGCTGCTGGGGG
TGGGGGATCGGAGCATCGACTGGCGATTGGCGGCGGAGCGGGCCGGAAACGCCCGT
GCTCTCGGTGAATCCGAACCTGCTCATTTTCGTGGAAGGTGTGCAGAGCTACAACGG
AGACTCCTACTGGTGGGGGGGCAACCTGCAAGGAGCCGGCCAGTACCCGGTCTGTGC
TGAACCTGCGGAACCGGCTGGTGTACTCGGCGGCAAGACTACGGGACGAGCGTCGGG
CCGCAGACGTGGTTGAGCGATCCGACCTTCCCGAACAACATGCCCGGCATCTGGAAC
AAGAAGTGGGGATACCTCTTCAATCAGAACATTGCACCGGTATGGGTGGGGGAATTC
GGTACGACACTGCAATCCACGACCGACGACGACGTGGCTGAAGACGCTCGTCCAGTA
CCTACGGCCGACCGCGCAATACGGTGGCGACAGCTTCCAGTGGACCTTCTGGTCTCTG
GAACCCCGATTCCGGCGACACAGGAGGAATTCTCAAGGATGACTGGCAGACGGTCTG

ACACAGTAAAAGACGGCTATCTCGCGCCGATCAAGTCCGTCCGATTTTCGATCCTGTCT
AATGAATCGCCTAGCAGTCAACCGTCCCCGTCCGGTGTCCCGCTCTCCGTCCCGGAGG
CCGTCCGGCGAGTCCGACGCGCGACGCCTACTCCGACGCGGACAGCCAGCCCGACGCC
AACGGTGACCCCTACTGCTACGCCCCACGCCACGGCAAGCCCGACGCGGTGACCGA
CGGCAGCCTCCCGAGCCCGCTGCACCGCGAGTTACCAGGTCAACAGCGATTGGGGG
AAT,

GCGGGCGCGCGCTATTGGCAGACGAGCGGCGGGAGATCCTGGACGCGAACAACGT
GCGGGTACGGATCGCCGGCATCAACTGGTTTGGGTTCGAAACCTGCAATTACGTCTT
GCACGGTCTCCGGTCACCGGACTACCGCAGCATGCTCGACCAGATAAAGTCCGTCTG
GCTACAACACAATCCGGCTGCGGTACTCTGACGACATTCTCAAGCCGGGGCACCATGG
CGAACAGCATCAATTTTACCAGATGAATCAGGACCTGCAGGGTCTGACGTCTTGG
AGGTCATGGACAAAATCGTCCCGTACGCCGGTCCAGATCGGCCCTGCGCATCATTCTTG
ACGGCGACCGACCGGATTGACGCGGGGAGTCCGGCGCTGTGGTACAGGAGCAGCGTG
TCGGAGGCTACGTGGATTTCCGACCTGCAAGCGCTGGCGCAGCGCTACAAGGGAAA
CCCGACGGTCTGTCGGCTTTGACTTGGACAACGAGCCGCATGACCCGGCCTGCTGGGG
CTGCGGCGATCCGAGCATCGACTGGCGATTGGCCGCCGAGCGGGCGCGAAACGCGG
TGCTCTCGGTGAATCCGAACCTGCTCATTTTCGTGGAAGGTGTGCAGAGCTACAACG
GAGACTCCTACTGGTGGGGCGGCAACCTGCAAGGAGCCGGCCAGTACCCGGTCTGTG
GTGAACGTGCCGAACCGCCTGGTGTACTCGGGCGACGACTACGGGACGAGCGTCTA
CCCGCAGACGTGGTTCAGCGATCCGACCTTCCCGAACAACATGCCCGGGCATCTGGAA
CAAGAACTGGGGATACCTCTTCAATCAGAACATTGCACCGGTATGGCTGGGCGAATT
CGGTACGACACTGCAATCCACGACCGACGACGCTGGCTGAAGACCGCTCGTCCAGT

ACCTACGGCCGACCGCGCAATACGGTGCGGACAGCTTCAGTGGACCTTCTGGTCCT
GGAACCCCGATTCCGGCGACACAGGAGGAATTCTCAAGGATGACTGGCAGACGGTC
GACACAGTAAAAGACGGCTATCTCGCGCCGATCAAGTCGTCGATTTTCGATCCTGTG
TAATGAATCGCCTAGCAGTCAACCGTCCCCGTGGTGTCGGCCGTCTCCGTGCGCGAG
CCCGTGGCGGAGTGGGACGCGGACGGCTACTCGGACGCGGACAGCCAGCCCGACGC
GAACGGCTGACCCCTACTGCTACGCGGACGCGGACGGCAAGCCCGACGCGCTCACCG
ACGGCAGCCTCCGGAGCCCGCTGCAGCGCGAGTTACCAGGTCAACAGCGATTGGGG
CAATGGCTTCACGGTAACGGTGGCGGTGACAAATTCCG, and

GCGGGCGGCGGCTATTGGCAGACGAGCGGCGCGGAGATCCTGGACGCGAACAACGT
GCGGGTACGGATCGCCGGCATCAACTGGTTTGGGTTCGAAACCTGCAATTACGTGCT
GCACGGTCTCTGGTCACGGACTACGGCAGCATGCTCGACCAGATAAAGTCGCTCGG
CTACAACACAATCCGGCTGCGGTACTCTGACGACATTCTCAAGCCCGGGCACCATGCC
GAACAGCATCAATTTTCGGGAGATGAATCAGGACCTGCAGGGTCTGACGTCTTTGCA
GGTCATGGACAAAATCGTGGCGTACGCGGCTCAGATCGGCGCTGGCGCATCATTTCTGA
CCGCCACCGACCGGATTGCAGCGGGCAGTCGGCGCTGTGGTACACGAGCAGCGTCT
CGGAGGGTACGTGGATTTCGGACCTGCAAGCGCTGGCGCAGCGCTACAAGGGAAAG
CGAECGGTCTGTCGGCTTTGACTTGACACAACGAGCCGCATGACCCGGCCTGCTGGGGC
TGGGGCGATCCGAGCATCGACTGGCGATTGGCGCGCGAGCGGCGCGGAAACCGCGT
GCTCTCGGTGAATCCGAACCTGCTCATTTTCGTGGAAGGTGTGCAGAGCTACAACGG
AGACTCCTACTGGTGGGGCGGCAACCTGCAAGGAGCGCGGCGAGTACCCGGTGGTGG
TGAACGTGCCGAACCGCCTGGTGTACTCGGCGCAGGACTACGGCAGCAGCGTCTAG
CGGCAGACGTGGTTACGGATCCGACCTTCGCCAACAACATGCCCGGGCATCTGGAAC

AAGAACTGGGGGATACCTCTTCAATCAGAACATTGCACCGGTATGGCTGGGGCGAATTC
 GGTACGACACTGCAATCCACGACCGGACCAGACGCTGGCTGAAGACGCTCGTCCAGTA
 CCTACGGCCCGACCGCGCAATACGGGTGCGGACAGCTTCCAGTGGACCTTCTGGTCTCTG
 GAACCCCGGATTCCGGGGGACACAGGAGGAATTCTCAAGGATGACTGGCAGACGGTCTG
 ACACAGTAAAAGACGGGTATCTCGCGCGCGATCAAGTCGTCGATTTTTCGATCCTGTCT
 AATGAATCGCCTAGCAGTCAACCGTCCCCGTCCGGTGTGCGCGCTCTCCGTGGCCGAGC
 CCGTCCGGCGAGTCCGACGCCGACGCCTACTCCGACGCCCGACAGCCAGCCCCGACGCC
 AACGGTGACCCCTACTGCTACGCCCCACGCCCCACGGGAAGCCCCGACGCCGTACCCGA
 CCGCAGCGCTCCGGAGCCCCGCTGCACCGCGAGTTACCAGGTCAACAGCGATTGGGGG
 AATGGCTTCACGGTAACGGGTGGCCCGTGACAAATTCGG

AGGGYWHTSG	REILDANNVP	VRIAGINWFG	FETCNVYVHG	LWSRDYRSM	DQIKSLGYNT	60
IRLPYSDDIL	KPGTMPNSIN	FYQMNQDLQ	LTSLQVMDKI	VAYAGQIGLR	IILDRHRPDC	120
SGQSALWYTS	SVSEATWISD	LQALAORYKG	NPTVVGFDLH	NEPHDPACWG	CGDPSIDWRL	180
AAERAGNAVL	SVNPNLLIFV	EGVQSYNGDS	YWWGGLQGA	GQYPVVLNVP	NRLVYSAHDY	240
ATSVGPQTWF	SDPTFPNNMP	GIWNKNWGYL	FNQNIAPVWL	GEFGTTLQST	TDQTLKTLV	300
QYLRPTAQYG	ADSFQWTFWS	WNPDSGDTGG	ILKDDWQTV	TVKDGYLAPI	KSSIFDPV	358

SEQ ID NO. 2;

AGGGYWHTSG	REILDANNVP	VRIAGINWFG	FETCNVYVHG	LWSRDYRSM	DQIKSLGYNT	60
IRLPYSDDIL	KPGTMPNSIN	FYQMNQDLQ	LTSLQVMDKI	VAYAGQIGLR	IILDRHRPDC	120
SGQSALWYTS	SVSEATWISD	LQALAORYKG	NPTVVGFDLH	NEPHDPACWG	CGDPSIDWRL	180
AAERAGNAVL	SVNPNLLIFV	EGVQSYNGDS	YWWGGLQGA	GQYPVVLNVP	NRLVYSAHDY	240
ATSVGPQTWF	SDPTFPNNMP	GIWNKNWGYL	FNQNIAPVWL	GEFGTTLQST	TDQTLKTLV	300
QYLRPTAQYG	ADSFQWTFWS	WNPDSGDTGG	ILKDDWQTV	TVKDGYLAPI	KSSIFDPV	358

SEQ ID NO. 3;

and

AGGGYWHTSG	REILDANNVP	VRIAGINWFG	FETCNVYVHG	LWSRDYRSM	DQIKSLGYNT	60
IRLPYSDDIL	KPGTMPNSIN	FROMNQDLQ	LTSLQVMDKI	VAYAGQIGLR	IILDRHRPDC	120
SGQSALWYTS	SVSEATWISD	LQALAORYKG	NPTVVGFDLH	NEPHDPACWG	CGDPSIDWRL	180
AAERAGNAVL	SVNPNLLIFV	EGVQSYNGDS	YWWGGLQGA	GQYPVVLNVP	NRLVYSAHDY	240
ATSVGPQTWF	SDPTFPNNMP	GIWNKNWGYL	FNQNIAPVWL	GEFGTTLQST	TDQTLKTLV	300
QYLRPTAQYG	ADSFQWTFWS	WNPDSGDTGG	ILKDDWQTV	TVKDGYLAPI	KSSIFDPV	358

SEQ ID NO. 4; or a mixture thereof.

AAGAACTGGGGATACCTCTTCAATCAGAACATTGCACCGGTATGGCTGGGGGAATTG
 GGTACGAGACTGCAATCCACGACCGACCAAGAGCGTGGCTGAAGACGCTCGTCCAGTA
 CCTACGGCGGACCGCGCAATACGGTGCGGACAGCTTCCAGTGGACCTTCTGGTCCTG
 GAACCCCGATTCCGGCGACACAGGAGGAATTCTCAAGGATGACTGGCAGAGGGTCG
 ACACAGTAAAAGACGGGCTATCTCGCGCCGATCAAGTCGTGCGATTTTCGATCGTGTCT
 AATGAATCGCCTAGCAGTCAACCGTCCCGGTCGGTGTCCCGCTCTCCGTCCCGGAGG
 CCGTCCCGGAGTCCGACGCGGACGCCTACTCCGACGCGGACAGCCAGCGCGACGCG
 AAGCGTGACCCCTACTGCTACGCCACGCCCCACGGCAAGCGCGACGCGGTCACCGA
 CGGCAGCCTCCGGAGCCCCGCTGCACCGCGAGTTACCAGGTCAACAGCGATTGGGGG
 AATGGCTTCACGGTAACGGTGGCCGTGACAAATTCCG

AGGGYWHTSG	REILDANNVP	VRIAGINWFG	FETCNVYVHG	LWSRDYRSM	DQIKSLGYNT	60
IRLPYSDDIL	KPGTMPNSIN	FYQMNQDLQG	LTSLOVMDKI	VAYAGQIGLR	IILDRHRPDC	120
SGQSALWYTS	SVSEATWISD	LQALAQRYKG	NPTVVGFDLH	NEPHDPACWG	CGDPSIDWRL	180
AAERAGNAVL	SVNPNLLIFV	EGVQSYNGDS	YWWGGNLQGA	GQYPVVLNVP	NRLVYSAHDY	240
ATSVGPQTFW	SDPTFPNNMP	GIWNKNWGYL	FNQNIAPVWL	GEFGTTLQST	TDQTLWKLTV	300
QYLRPTAQYG	ADSFQWTFWS	WNPDSGDTGG	ILKDDWQTV	TVKDGYLAPI	KSSIFDPV	358

SEQ ID NO. 2;

AGGGYWHTSG	REILDANNVP	VRIAGINWFG	FETCNVYVHG	LRSRDYRSM	DQIKSLGYNT	60
IRLPYSDDIL	KPGTMPNSIN	FYQMNQDLQG	LTSLOVMDKI	VAYAGQIGLR	IILDRHRPDC	120
SGQSALWYTS	SVSEATWISD	LQALAQRYKG	NPTVVGFDLH	NEPHDPACWG	CGDPSIDWRL	180
AAERAGNAVL	SVNPNLLIFV	EGVQSYNGDS	YWWGGNLQGA	GQYPVVLNVP	NRLVYSAHDY	240
ATSVGPQTFW	SDPTFPNNMP	GIWNKNWGYL	FNQNIAPVWL	GEFGTTLQST	TDQTLWKLTV	300
QYLRPTAQYG	ADSFQWTFWS	WNPDSGDTGG	ILKDDWQTV	TVKDGYLAPI	KSSIFDPV	358

SEQ ID NO. 3;

and

AGGGYWHTSG	REILDANNVP	VRIAGINWFG	FETCNVYVHG	LWSRDYRSM	DQIKSLGYNT	60
IRLPYSDDIL	KPGTMPNSIN	FYQMNQDLQG	LTSLOVMDKI	VAYAGQIGLR	IILDRHRPDC	120
SGQSALWYTS	SVSEATWISD	LQALAQRYKG	NPTVVGFDLH	NEPHDPACWG	CGDPSIDWRL	180
AAERAGNAVL	SVNPNLLIFV	EGVQSYNGDS	YWWGGNLQGA	GQYPVVLNVP	NRLVYSAHDY	240
ATSVGPQTFW	SDPTFPNNMP	GIWNKNWGYL	FNQNIAPVWL	GEFGTTLQST	TDQTLWKLTV	300
QYLRPTAQYG	ADSFQWTFWS	WNPDSGDTGG	ILKDDWQTV	TVKDGYLAPI	KSSIFDPV	358

SEQ ID NO. 4 ; or a mixture thereof.